

Claims

1. A lithographic apparatus comprising:
  - an illumination system configured to provide a projection beam of radiation;
  - a support structure configured to hold a patterning device, the patterning device configured to impart the projection beam with a pattern in its cross-section;
  - a substrate table configured to hold a substrate;
  - a projection system configured to project the patterned beam onto a target portion of the substrate; and
  - a positioning device configured to position an object table comprising:
    - a first part comprising a magnetic field distribution that periodically alternates in a first direction and in a second direction perpendicular to the first direction, wherein the magnetic field distribution is anisotropic with respect to said first and second directions, and
    - a second part comprising a first set of coils arranged relative to the first part to generate a force in at least the first direction and a second set of coils arranged relative to the first part to generate a force in at least the second direction.
2. A lithographic apparatus according to claim 1, wherein the magnetic field distribution is generated by permanent magnets.
3. A lithographic apparatus according to claim 2, wherein said permanent magnets have substantially the same shape.
4. A lithographic apparatus according to claim 1, wherein said magnetic field distribution is generated by an alternating arrangement of octagonal shaped magnets and square shaped magnets in said first and second directions wherein the magnets along said first direction have the same polarity while the magnets along said second direction have an alternating polarity.

5. A lithographic apparatus according to claim 1, wherein said magnetic field distribution is generated by an arrangement of rectangular shaped magnets in said first and second directions, wherein the magnets along said first and second directions have the same polarity.
6. A lithographic apparatus according to claim 1, wherein said magnetic field distribution is generated by an alternating arrangement of magnets of a first type and of a second type in said first and second directions, wherein the magnets along said first direction have alternating polarity, the magnets along said second direction have the same polarity, and the magnets of the first type are a different size than the magnets of the second type.
7. A lithographic apparatus according to claim 1, wherein said magnetic field distribution is generated by an arrangement of hexagonal shaped magnets in said first and second directions.
8. A lithographic apparatus according to claim 7, wherein the magnetic pitch of the magnets is the same for both first and second directions.
9. A lithographic apparatus according to claim 1, wherein the magnetic field distribution is generated by a two-dimensional Halbach array extending in the first and second directions, wherein the gaps between magnets of the Halbach array comprise square shaped magnets, the square shaped magnets along said first and second directions having the same polarity.
10. A lithographic apparatus according to claim 1, wherein the magnetic field distribution is generated by at least one current carrying conductor.

11. A lithographic projection apparatus according to claim 10, wherein said at least one current carrying conductor is at least partly embedded in a ferromagnetic plate.

12. A lithographic apparatus according to claim 10, wherein said at least one current carrying conductor is a superconductor.

13. A device manufacturing method comprising:

- positioning an object table using a positioning device, the positioning device comprising:
  - a first part comprising magnetic field distribution that periodically alternates in a first direction and in a second direction perpendicular to the first direction, wherein the magnetic field distribution is anisotropic with respect to said first and second directions, and
  - a second part comprising a first set of coils arranged relative to the first part to generate a force in at least the first direction and a second set of coils arranged relative to the first part to generate a force in at least the second direction; and
- projecting a patterned beam of radiation onto a target portion of a substrate.